

I B.Tech Year(R07) Supplementary Examinations, May/June 2010
MATHEMATICS-I
 (Common to all branches)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. (a) Solve $(x^2 - y^2) dx = 2xy dy$
 (b) Solve $(3y + 2x + 4) dx - (4x + 6y + 5) dy = 0$. [8+8]
2. Solve $(D^2 + 4D + 8) y = e^{-2x} + \cos^2 x$. [16]
3. (a) Find the region in which $f(x) = 1 - 4x - x^2$ is increasing and the region in which it is decreasing using Mean Value Theorem .
 (b) Find the minimum value of $x^2 + y^2 + z^2$ given $x + y + z = 3a$. [8+8]
4. (a) Find the radius of curvature of $x = \log t$, $y = \frac{1}{2}(t + t^{-1})$ at $t = 1$.
 (b) Find the envelope of $\frac{x}{a} \cos \theta + \frac{y}{b} \sin \theta = 1$ where ' θ ' is a parameter. [8+8]
5. (a) Evaluate $\int_0^1 \int_0^{1-x} \int_0^{1-x-y} dx dy dz$.
 (b) Find the surface area of the solid generated by revolving the arc of the parabola $x^2 = 12y$, bounded by its latus rectum about y-axis. [8+8]
6. (a) Examine the convergence of $\sum [(1 \cdot 4 \cdot 7 \cdot \dots \cdot (3n - 2)) / (3 \cdot 6 \cdot 9 \cdot \dots \cdot 3n)]^2$
 (b) Examine the convergence of $1 - 1/2^2 + 1/3^2 - 1/4^2 + \dots$ [8+8]
7. If $\vec{F} = 2xz \vec{i} - x\vec{j} + y^2 \vec{k}$, Evaluate $\iiint_V \vec{F} dv$ where V is the region bounded by the planes $x = y = z = 0, x = y = z = 1$. [16]
8. (a) Solve $y(t) = 1 + \int_0^t f(t-u) \cos u du$.
 (b) Find $L^{-1} [(2s^2 + 3) / s^2 (s^2 + 1) (s^2 + 2)]$. [8+8]
